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(54) Name of the invention: Preservation Agent Used for Food Products

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## **JP 61-152269**

*Note: Names, addresses, company names and brand names are translated in the most common manner. Japanese language does not have singular or plural words unless otherwise specified by a numeral prefix or a general form of plurality suffix.*

### **Description of the invention**

#### **1. Name of the invention**

#### **Preservation Agent Used for Food Products**

#### **2. Scope of the claims of the invention**

Preservation agent used for food products that contains monoglycerin aliphatic acid ester, glycerin and ethanol.

#### **3. Detailed explanation of the invention**

##### **[Technological sphere of application]**

The present invention is an invention about a food preservation agent.

##### **[Previous technology]**

In the past, it has been suggested that monoglycerin aliphatic acid esters (here below called monoglycerides for short), at low concentrations, show antibacterial properties and preservation properties, and already these materials have been used with these goals for some food products.

##### **[Problem points solved by the present invention]**

However, in the case of the monoglyceride manufactured agents that have been produced in the past, because of the fact that their antibacterial properties are insufficient, the results from the evaluation at the practical use level, have been low. And in order to effectively use the preservation action of the monoglycerides at the low concentration level, it has been necessary

to use a specific compounding agent used in food preservation that has helps alleviate this drawback of the monoglyceride type materials.

**[Measures in order to solve the problems]**

Then, the authors of the present invention have conducted different types of studies and as a result from these studies they have observed that in the case when in the food products there is a compounded agent obtained as a monoglyceride is dissolved in glycerine and ethanol, the preservation effect that has been obtained by the original material when used individually, is further increased, and together with that the softness properties of the food product are preserved, and then also, the stability properties of the manufactured agent, are also good. Based on that the present invention has been achieved.

As the monoglyceride used according to the present invention, there are the already used in the food product industry materials like the monoglycerides of the caprilic acid, the caprinic acid, the laurinic acid, etc., acids where the number of the carbon atoms is C8, C10, however, the caprinic acid monoglyceride is especially preferred.

As the glycerin, the glycerin used in food products, advantageously used in the food products industry, is preferred. Namely, for the glycerin concentration, usually, it is preferred that it is at least 50 % or higher, and preferably it is at least 80 % or higher, and even more preferably, it is at least 90 % or higher. Regarding the ethanol used, it is preferred to use the ethanol used in food products, and regarding its concentration, it is preferred that a material is used where it is at least 40 % or higher, and preferably, at least 80 % or higher, and even more preferably, it is at least 90 % or higher.

For the manufacturing of the product according to the present invention, it is a good option if ethanol, glycerin and monoglyceride, are mixed and dissolved.

Regarding their compounding ratio, the monoglyceride is in the range of 5 ~ 50 %, and preferably, it is in the range of 10 ~ 30 %, the glycerin is in the range of 40 ~ 80 %, and preferably in the range of 50 ~ 70 %, and the ethanol is in the range of 10 ~ 50 %, preferably, in the range of 10 ~ 50 %.

This compounded agent is a material that can be used in all food products, however, especially, it is effective in the case of the large amount of gas swelling and odor, developed in side dishes, beverages, taste adjusting liquids, and besides that in wheat flour manufactured products, fish type products, etc. And regarding the amount added, it is a good option if the glyceride is at least 200 ppm or higher, and preferably, at least 500 ppm or higher in the food product.

### [Results from the invention]

After that, the fact that the preservation agent according to the present invention has excellent results, will be explained by practical examples.

### Test Example 1

To 40 parts of water, 0.6 parts of the present invention product according to the Practical Example 1, are added and dissolved and after that 100 parts of wheat flour and 1 part of table salt, are used, and according to the usual methods, a shell was prepared (containing 600 ppm as a glyceride).

The obtained material was packed by using a polyethylene film, and at a temperature of 15°C, the number of bacteria with the passing of time, was measured, and also, the appearance of ethyl acetate odor was monitored.

Moreover, a product where a preservation agent has not been added, a commercially available monoglyceride manufactured agent (monoglyceride: starch = 1: 1) additive product (contained in an amount of 600 ppm as a monoglyceride), were used as a comparison.

The results are shown in the presented here below Table 1.

(number/gram)

試料区	1	2	3	4	5
無添加区	$1.2 \times 10^3$	$2.6 \times 10^4$	$2.5 \times 10^7$	$1.2 \times 10^8$	—
本発明品添加区	$2.3 \times 10^3$	$2.1 \times 10^3$	$1.1 \times 10^6$	$1.9 \times 10^7$	$8.3 \times 10^7$
市販品	$4.2 \times 10^3$	$4.2 \times 10^4$	$1.9 \times 10^7$	$1.6 \times 10^8$	—

- there is gas generation and ethyl acetate odor.

Headings in the table:

1. number of days, 2. experimental segment, 3. segment without an addition, 4. segment where the present invention product has been added, 5. segment where the commercially available product has been added.

In the case of the segment where the present invention product has been added, even after the completion of the experiment the same softness properties were preserved as those displayed at the beginning.

### Test Example 2

A side dish was produced from a food type product ( squid, octopus), seaweeds, and taste adjusting materials (spices), and 0.8 % of the present invention product according to the Practical Example 1 (800 ppm as a monoglyceride), and the same amount of the commercial monoglyceride that has been used according to the Practical Example 1, were added, and after that, the circumstances of the decay at a temperature of 25°C with the passing of the time, were observed. Regarding the bacteria count measurement, there was a generation of large amount especially in this type of food product, and yeast that exudes an ethyl acetate odor, was observed.

The results are shown in Table 2.

Table 2:

	1	2	3	4	5
1. 菌数測定	$1.2 \times 10^5$	$5.0 \times 10^7$	—	—	—
2. 腐敗状態	$4.2 \times 10^3$	$1.0 \times 10^4$	$5.1 \times 10^4$	$6.3 \times 10^4$	$4.6 \times 10^5$
3. 臭気検出	$4.8 \times 10^3$	$2.3 \times 10^3$	$6.2 \times 10^3$	$2.6 \times 10^4$	$4.9 \times 10^7$

- gas swelling and ethyl acetate odor

Headings in the table:

1. segment without addition, 2. segment where the present invention product has been added, 3. segment where a monoglyceride has been added.

### Test Example 3

A taste adjusting liquid, where in advance the present invention monoglyceride according to the Practical Example 1, has been added so that it becomes 600 ppm in the taste adjusting liquid, was prepared according to the usual methods, and it was separated in equal amounts, and it was added into pickled daikon.

Then, it was vacuum packed and after that, the number of bacteria developed with time at a temperature of 25°C, was measured, and also, the appearance was observed.

Moreover, a product where a preservation agent has not been added, caprinic acid, and monoglyceride added products, were compared.

The results are shown in Table 3.

(number/gram)

1	2	3	4	5	6	7	8
実験区	一般生菌数	2.7×10 <sup>5</sup>	2.3×10 <sup>4</sup>	2.0×10 <sup>5</sup>	2.6×10 <sup>5</sup>		4日後
対照区	酵母数	2.3×10 <sup>5</sup>	2.9×10 <sup>4</sup>	1.5×10 <sup>5</sup>	4.0×10 <sup>4</sup>		1週間後
本発明品	一般生菌数	3.7×10 <sup>2</sup>	5.5×10 <sup>3</sup>	4.0×10 <sup>4</sup>	2.5×10 <sup>4</sup>	2.0×10 <sup>5</sup>	14日後
添加区	酵母数	1.1×10 <sup>5</sup>	0.7×10 <sup>2</sup>	2.1×10 <sup>2</sup>	4.3×10 <sup>3</sup>	1.5×10 <sup>5</sup>	腐敗なし
2週間後	一般生菌数	1.2×10 <sup>3</sup>	2.2×10 <sup>4</sup>	0.6×10 <sup>4</sup>	2.6×10 <sup>5</sup>	5.0×10 <sup>5</sup>	12日後
添加区	酵母数	1.1×10 <sup>5</sup>	2.2×10 <sup>3</sup>	4.0×10 <sup>4</sup>	4.0×10 <sup>5</sup>		腐敗なし

Headings in the table:

1. number of days, 2. experimental segment, 3. segment without addition, 4. number of usual live bacteria, 5. number of yeast, 6. segment where the present invention product has been added, 7. segment where a monoglyceride has been added, 8. changes in the



appearance, 9. after 6 days – gas swelling, 10. there is no difference after 16 days, 11. gas swelling after 12 days.

With the exception of the segment using the product according to the present invention, in the case of the other segments at the time of the gas swelling on the front surface of the pickled material yeast was observed.

#### Test Example 4

Manufactured according to the usual methods taste imparting hormone was taken in even parts and in advance, the taste adjusting liquid containing 0.3 % of the present invention product according to the Practical Example 2, was added, and then, it was vacuum packed. After that, under a temperature of 15°C, its yeast count was measured with the passing of the time.

Table 4

	1	2	3	4
1. 加 糖 加 区	$<10^2$	$6.7 \times 10^2$	$4.5 \times 10^4$	$1.4 \times 10^4$
2. 无 糖 加 区	$<10^2$	$<10^2$	$<10^2$	$1.2 \times 10^2$

Headings in Table 4:

- 1.. segment where there was no addition, 2. segment where the product according to the present invention has been added.

#### Test Example 5

By using potato dextrose vegetable gelatine bacteria culture medium manufactured by adding the present invention product, prepared in advance ethanol resistant yeast *Hansenula anomala*, in an amount of approximately  $1 \times 10^2$  units, were inoculated, and at a temperature of 25°C, these were cultivated for a period of 7 days, and after that, the collected failing number of the breeding bacteria was measured.

The results are shown in Table 5.

Table 5 (Number of collected failing bacteria that is breeding per one shale)

1	試驗區	集落數	3
2	無菌區	223	
4	0.3% 添加區	76	
	0.4% "	0	
	0.8% "	0	

Headings in the table:

1. Experimental segment, 2. segment without addition, 3. number of collected failing bacteria, 4. ... % added segment.

### Test Example 6

The present invention product according to the Practical Example 1 and as a comparison, a solution of 10 % caprylic acid monoglyceride and 90 % glycerin, were sealed in a bottle ( diameter of 4 cm, height of 8 cm), and they were left for a period of 24 hours at a temperature in the range of 5 ~ 10oC or at -15oC, and after that the state of the solution was observed. The results are shown in Table 6.

	5 ~ 10oC	- 15oC	Remarks
Product according to the present invention	Colorless, transparent	Same as on the left side	Even at the temperature of -15oC, it had flowability properties and a change was not observed.
Comparative product	White suspension	Same as on the left side	At a temperature of -15oC it had no flowability properties.

As it is clear from the above described, if the product according to the present invention is used, during the test time period for the observation of

the increase of the number of bacteria, a generation of gas swelling and ethyl acetate odor were not observed, and also, even relative to yeast a high growth prevention effect, was displayed. Also, the deterioration of the food product also was small, and then, the agent according to the present invention was an extremely stable material.

Consequently, the product according to the present invention is an extremely excellent material as a preservation agent used for food products.

Here below, by using practical examples, the method for the manufacturing of the preservation agent according to the present invention, will be explained.

Moreover, in the practical example, the term "parts" has the meaning of "weight parts".

#### **Practical Example 1**

70 parts of 99 % glycerin, 20 parts of 95 % ethanol, were mixed, and after that, 10 parts of caprilic acid glycerin ester were added and dissolved, and by that, the preservation agent according to the present invention, was obtained.

#### **Practical Examples 2 ~ 4**

By using the same method as the one described according to the Practical Example 1, preservation agents with the following here below composition, were obtained.

Practical Example	Monoglyceride	Glycerin	ethanol
2	Caprilic acid 20 parts	60 parts	20 parts
3	Caprinic acid 30 parts	65 parts	15 parts
4	Laurilic acid 15 parts	65 parts	20 parts

**Patent Assignee: Nippon Pharmaceutical Company**

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